

## Children's Classroom Engagement and School Readiness Gains in Prekindergarten

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Child engagement in prekindergarten classrooms was examined using 2,751 children (mean age = 4.62) enrolled in public prekindergarten programs that were part of the Multi-State Study of Pre-Kindergarten and the State-Wide Early Education Programs Study. Latent class analysis was used to classify children into 4 profiles of classroom engagement: *free play*, *individual instruction*, *group instruction*, and *scaffolded learning*. *Free play* children exhibited smaller gains across the prekindergarten year on indicators of language/literacy and mathematics compared to other children. *Individual instruction* children made greater gains than other children on the Woodcock Johnson Applied Problems. Poor children in the *individual instruction* profile fared better than nonpoor children in that profile; in all other snapshot profiles, poor children fared worse than nonpoor children.

There is growing concern about children's lack of readiness for school (Bowman, Donovan, & Burns, 2000). Evidence suggests that children's school readiness, particularly for children from disadvantaged backgrounds, is enhanced in prekindergarten programs during the year before kindergarten (e.g., Magnuson, Meyers, Ruhm, & Waldfogel, 2004). About three fourths of the states now offer such programs (Barnett, Hustedt, Friedman, Boyd, & Ainsworth, 2007). Identification of program characteristics related to improving skills is important given the huge investment of tax dollars and the importance of having vulnerable children enter

school ready to learn. The current study describes patterns of children's engagement in prekindergarten classrooms. Specifically, we used person-centered analyses to group children into profiles (i.e., groups) of classroom engagement that reflected the dominant literatures on early childhood education. Then, we explored whether profile membership was linked to gains in school readiness during the prekindergarten year. Additionally, we examined whether some profiles were particularly beneficial for poor children.

### *Classroom Quality: Children's Classroom Engagement Instead of Classroom Environment*

Higher quality prekindergarten programs are associated with more positive child outcomes (e.g., Burchinal et al., 2000). The literature on child-care environmental quality is primarily based on both constructivist theory, in which the adults' role is to provide children with rich materials that promote child-initiated exploration (Ginsburg & Oppen, 1988), and sociocultural theory, in which the adults'

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The NCEDL Multi-State and SWEEP Study of Pre-Kindergarten were conducted by a team of researchers, including Oscar A. Barbarin, Donna M. Bryant, Margaret Burchinal, Richard M. Clifford, Diane M. Early, Carollee Howes, and Robert C. Pianta. This study is supported under the Educational Research and Development Center Program, PR/Award R307A60004, as administered by the Institute of Education Sciences, U.S. Department of Education. However, the contents do not necessarily represent the positions or policies of the U.S. Department of Education, and endorsement by the federal government should not be assumed. NCEDL is grateful for the help of the many children, parents, teachers, administrators, and field staff who part of this study.

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role is to provide frequent sensitive and responsive interactions with children (Vygotsky, 1962). The assessment of quality is typically at the classroom level and involves global assessments across all activities. Many measures focus on the teacher, although some widely used measures examine the relationship between an individual child and teacher.

Examining children's classroom engagement can provide additional information that is not available in the environmental quality assessments. The importance of focusing on child-level experiences is stressed in Howes's theoretical model for children's child-care experiences (Howes, 2000), where children's experiences—play activities, peer play, and relationships—are embedded within the context of the classroom. That is, although measures of child-care environmental quality describe the context within which child engagement occurs, a direct examination of child engagement at the child level is needed to understand exactly what children are doing—what activities are occupying children's time—within those contexts. Although children's engagement and the classroom social context certainly influence each other (e.g., Howes & Smith, 1995), they remain distinct constructs.

Another reason to look beyond environmental quality to classroom engagement is that common measures of classroom environmental quality might not adequately capture dimensions of the classroom that are linked to child outcomes. A meta-analysis of 20 studies of the relation between measures of child-care quality and child outcomes showed that the relation is weak ( $r = .12$ ; Burchinal et al., 2008). The types of activities and level of interactions with the caregiver are also known to be important in predicting preschool children's learning in child-care settings (Howes et al., 2008).

#### *A Person-Centered Approach*

Child engagement has thus far been examined using regression, which examines each child engagement activity individually (e.g., Howes et al., 2008). Another method is a person-centered approach, which would consider the entire spectrum of activity engagement of each child to place children into profiles, or subgroups. As such, children within the same profile would exhibit more similar patterns of classroom engagement than children in different profiles. A person-centered approach is more holistic than regression because it considers the entire constellation of child engagement rather than one child engagement at a time.

One type of person-centered analysis, cluster analysis, was used in an earlier study that clustered children based on their classroom engagement (Tonyan & Howes, 2003). Latent class analysis (LCA) is another person-centered approach that offers several advantages over cluster analysis. One advantage is that LCA provides model fit statistics that allow assessment of the model fit to the data, and the appropriateness of the number of profiles specified. In addition, because LCA is model based, the same results can theoretically be replicated with an independent sample (Muthén & Muthén, 2000). LCA would be an ideal method for identifying profiles of children based on their patterns of classroom engagement.

#### *Patterns of Classroom Engagement*

Based on dominant models of early childhood education (e.g., the constructivist or sociocultural models), three profiles might be expected to emerge from a LCA of children's classroom engagement: a profile that emphasizes free-choice play and exploration, a profile that emphasizes teacher instruction, and a profile that emphasizes teacher scaffolding.

One model of early childhood education encourages child-directed exploration in activities that the child chooses, positing that many developmental competencies are acquired only through play (Johnson, Christie, Yawkey, & Wardle, 1987). For example, sociodramatic play develops language and problem-solving skills; constructive play (e.g., blocks) helps children learn about symmetry and practice making mental plans. These skills, according to this model, are not readily learned via teacher instruction. Based on this model, we expect to see a profile of children that engages in primarily free-choice play activities.

A second model of early childhood education posits that children learn most from teacher instructional support, defined as large amounts of literacy instruction, high-quality teacher feedback, and teacher-led discussions that elicit cognitive skills (Hamre & Pianta, 2005). One study reported that more class time spent on direct and explicit instruction involving teacher feedback was linked to higher levels of student achievement (Meyer, Wardrop, Hastings, & Linn, 1993; Pianta, La Paro, Payne, Cox, & Bradley, 2002). Another study found that increased instructional time in each of four preacademic activities—letter-sound, oral language, being read to, and mathematics—was associated with higher teacher ratings of children's language and literacy skills (Howes et al., 2008). Based on

this model, we expect to see a profile of children that spends a lot of time in teacher-directed instructional activities.

A third model of learning emphasizes the importance of “scaffolding” by a more knowledgeable other that enables children to think and complete tasks at a higher level than if they were unassisted (Wood, Bruner, & Ross, 1976). An important element of quality early childhood education is teacher scaffolding of children’s learning (Smith, 1996), including scaffolding to develop young children’s literacy (Henderson, Many, Wellborn, & Ward, 2002). Because whether scaffolding occurs during free play or teacher instruction is less important, we might expect a third profile of children who are not distinguishable from other children by their engagement in free play or instructional time, but rather in their receipt of teacher scaffolding.

Different models of classroom engagement may be more beneficial for different types of child outcomes. Children in classrooms that give children opportunities for free play and exploration might have more developed language and advanced mathematics and spatial skills (Johnson et al., 1987), according to the literature on free-choice play. Children in classrooms utilizing the instructional model might be expected to make greater gains in basic academic skills such as knowing numbers and letters and how to write their names, because these are skills more readily taught via teacher instruction and less likely learned through free play. Children in classrooms utilizing scaffolding might have more developed literacy skills (Henderson et al., 2002) or problem-solving skills (Rogoff, 1990). Including a variety of child outcomes makes it possible to assess whether certain models of early childhood education are best suited for particular domains of learning.

#### *Child Engagement and Poverty Status*

Children’s classroom engagement may also be linked to their poverty status. One study found, via teacher interviews, notable differences in the reported beliefs of preschool teachers of lower versus middle socioeconomic status (SES) children (Lee & Ginsburg, 2007). Teachers of lower SES children reported explicitly focusing on developing children’s literacy and mathematics skills through direct instruction to prepare children for kindergarten. Teachers of higher SES children, on the other hand, reported developing skills more indirectly by allowing children to engage in the literacy or math-

ematics activities of their choice in a classroom environment filled with rich learning materials. We therefore expect children’s classroom engagement to differ by poverty status, consistent with teacher beliefs reported in this study.

If preschool teachers of low- versus middle-income children have different beliefs about what constitutes an ideal preschool education, is there any evidence that their beliefs are accurate? That is, do low-income children indeed benefit more from a focus on mathematics and literacy skill development, whereas middle-income children benefit more from the freedom to choose activities? One study found that children who were at risk of school failure benefited more from classrooms with more direct literacy instruction, evaluative feedback, and instructional conversations during teacher-led discussions, compared to children who were not at risk (Hamre & Pianta, 2005). Therefore, poor children might be expected to benefit more from direct instruction of academic skills than from child-initiated free-play activities.

In the current study, we used LCA to classify children into profiles based on their classroom engagement. We then used profile membership to predict children’s gains from fall to spring of the prekindergarten year, in the areas of language and literacy and mathematics. Next, we examined sociodemographic differences across the class engagement profiles. Finally, we assessed whether different child engagement profiles provided different amounts of gains for poor versus nonpoor children.

## **Method**

### *Participants*

Study data come from the National Center for Early Development and Learning Multi-State Study of Pre-Kindergarten, and a follow-up study, the State-Wide Early Education Programs Study (SWEET). Both studies used a stratified random sampling method to select programs within states, classrooms within programs, and children within classrooms. States with large numbers of children enrolled in public prekindergarten and with programs that have had time to mature were selected. The Multi-State included six states (California, Illinois, Georgia, Kentucky, New York, and Ohio), with 40 programs selected from each state, and began in fall of 2001; the SWEET included five states (Massachusetts, New Jersey, Texas, Washington, and Wisconsin), with 100 programs

selected from each state, and began in fall of 2003. Programs were diverse with regard to urbanicity. All programs were state funded, although funding streams differed within and across states; 15% of programs were part of Head Start programs. A total of 701 programs participated, and one classroom was randomly selected from each program. In both the Multi-State and the SWEEP, 94% of classroom teachers agreed to participate. In the Multi-State and SWEEP, 61% and 55% of parents, respectively, gave consent to participate. Of the children with parent consent, four children (two boys and two girls) from each classroom were randomly selected to participate, making for a total of 2,966 children.

Sample classrooms had an average class size of 19 children and an adult-child ratio of 1:8.6. A majority of the children (58%) were from families living below the federal poverty line, and about half were boys (49%). The sample included children who were European American (41%), African American (18%), Latino (27%), Asian American (4%), Native American (1%), and of other ethnicities (10%). Mean maternal education was 12.8 years. Children with no classroom engagement observations ( $n = 215$ ) were dropped from the study, resulting in a final sample of 2,751 children.

### Measures

#### Classroom Observations

The Emerging Academics Snapshot (Ritchie, Howes, Kraft-Sayre, & Weister, 2001) is a measure of children's classroom engagement that captures children's moment-to-moment activities. Observations were conducted over 2 days in the Multi-State and over 1 day in the SWEEP, each in the spring. Each child was observed in 20-s interval "snapshots," followed by a 40-s coding period. The data collector then observed each of the other study children in that classroom before coming back to observe the first child again, continuing in this manner for the entire day. During each 20-s snapshot, children were coded with one of six mutually exclusive *activity settings*: basics, free choice, individual time, meals, small group, and whole group; one or more *preacademic engagements*: esthetics, fine motor skills, gross motor skills, letter and sound, mathematics, oral language development, prereading, read to, science, social studies, and writing; and one or more *teacher-child interactions*: routine, minimal, simple, elaborated, scaf-

folding, and didactic (see Table 1 for a detailed description of each child engagement). Kappas range from .70 to .87.

Global classroom environmental quality was assessed using the Early Childhood Education Rating System-Revised (ECERS-R; Harms, Clifford, & Cryer, 1998) and the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2004). The ECERS-R assesses aspects of the preschool classroom, such as room arrangement and furnishings and relaxation. Scores from the Multi-State study reflect the mean of a fall and a spring observation, and scores from the SWEEP study reflect a single observation day in the fall. Composite ECERS-R scores range from 1 (*inadequate quality*) to 7 (*excellent quality*). Factor analysis of the ECERS-R yielded two factors, one of which was used in the current study: the Teaching and Interactions factor, which consisted of items such as Encouraging Children to Communicate, Discipline, and Interactions among Children. The CLASS rates the emotional climate, classroom climate, and instructional supports for learning in early childhood classrooms. Classrooms were rated from 1 (*low*) to 7 (*high*) on nine dimensions, such as Positive Climate, Teacher Sensitivity, and Concept Development. Data collectors rated the classroom and teacher on the nine dimensions about every 30 min throughout an observation day. The CLASS scores for children in the Multi-State study reflect the mean of a fall and a spring observation, and for children in the SWEEP study a single observation day in the spring. Factor analysis of the CLASS yielded two factors, one of which was used in the current study: Instructional Climate, which is a composite of Concept Development and Quality of Feedback.

Centralized training of all observers was conducted for the three classroom observations. Prior to data collection, observers were certified via reliability tests that compared observers' ratings with experts' ratings. Interrater agreement was evaluated using weighted Kappas, which adjust for agreement due to chance; observers with an overall kappa of at least .60 were certified (see Pianta et al., 2005, for complete details). Kappas ranged from .65 to .81 for the ECERS-R, CLASS, and Snapshot; Kappas of .65 or higher indicate good agreement (Landis & Koch, 1977).

#### Indicators of School Readiness

*Direct child assessments.* In the fall and spring, children's language, preliteracy, and mathematics skills were conducted by a different data collector



Table 1  
*Definitions for the Emerging Academics Snapshot*

Code	Description
<b>Activity settings</b>	
Basics	Napping, toileting, standing in line, cleaning up, or waiting between activities
Free choice	Child selects what and where to play or learn, engaging in activities such as individual art projects, blocks, pretend play, and reading
Individual time	Child and the rest of the class each work on a project independently, such as a worksheet or on the computer. The teacher moves around to help
Meals	Eating lunch, breakfast, or snacks
Small group	Small-group activities that are teacher organized or teacher led, such as group art projects, writing stories, or collective building
Whole group	Whole-group activities that are teacher initiated, such as stories, songs, calendar, discussions, book reading, and demonstrations
<b>Preacademic and academic activities</b>	
Esthetics	Art, drama, or music activities
Fine motor	Stringing beads, building with Legos, cutting, or using crayons and markers
Gross motor	Running, skipping, jumping, swinging, riding bikes, or playing games such as basketball, catch, run and chase, dancing, or musical chairs
Letter and sound	With guidance from teacher, child identifies letters, sounds out words, talks about letter-sound relationships, recognizes sounds using rhymes
Mathematics	Rote counting, counting with one-to-one correspondence, skip counting, matching numbers to pictures, making graphs, or playing counting games
Oral language	Child interacts with teacher or peers in talking about stories, or telling development stories of their own, or answering and asking open-ended questions
Prereading	Reading stories, identifying words, recognizing symbols and pictures as having meaning, or practicing a class poem
Read to	Teacher reads books and stories to child, engages in talking about the author, showing the cover, or asking questions about the book
Science	Child explores natural phenomena in their environment, uses science equipment, and reads books or talks about animals, body parts, and life cycles
Social studies	Talking, reading, or engaging in activities about their world (e.g., their neighborhood, their school, the farm, the community workers)
Writing	Writing (or using a computer keyboard to write) numbers or letters
<b>Teacher-child interactions</b>	
Routine	Teacher engages in routine caregiving (e.g., wipe child's nose)
Minimal	Teacher answers child's direct requests for help, or gives simple verbal directives with no reply encouraged, such as "okay," "stop that!"
Simple	Teacher uses some warm or helpful physical contact or verbally answers the child's verbal bids but does not elaborate
Elaborated	Teacher engages in some physical response (e.g., thumbs up, high fives, frown, glare) or acknowledges the child's statements and responds
Scaffold	Teacher (or a more capable peer) does one-on-one work with child and builds on child's initiations, using visuals, concrete objects, and gestures to help child learn. Teacher elicits responses and helps child expand his or her thoughts
Didactic	Teacher lectures, gives instructions, models, asks close-ended questions, or demonstrates, such as counting or saying the days of the week

from the one who conducted the classroom observations.

Children who spoke a home language other than English were given an English language screener, the Pre-LAS2000 (Duncan & De Avila, 1998). The Pre-LAS was first administered in the fall, and children who did not pass in the fall

were assessed again in the spring (fall:  $\alpha = .89$ ; spring:  $\alpha = .89$ ). Children who passed the screener (a score of 31 or higher of 40) were administered the English assessment battery (fall:  $n = 147$ ; spring:  $n = 117$ ). Children who did not pass the screener and who spoke Spanish at home were administered the Spanish assessment battery (fall:

$n = 394$ ; spring:  $n = 317$ ). Children who did not pass the screener and who spoke a language other than Spanish at home were not assessed in the Multi-State but were assessed in English in the SWEEP (fall:  $n = 39$ ; spring:  $n = 11$ ). With the exception of the Peabody Picture Vocabulary Test (PPVT) and the Test de Vocabulario en Imágenes Peabody (TVIP), English and Spanish assessments were collapsed for analysis so that children who were administered the fall assessments in Spanish and the spring assessments in English (i.e., the 117 children who passed the Pre-LAS in the spring) could be retained for analysis.

The PPVT-3rd Edition (PPVT-III; Dunn & Dunn, 1997) is a test of English receptive vocabulary where the child was shown a set of four pictures at a time and asked to select the picture that best represents the word spoken by the examiner (fall:  $\alpha = .96$ ; spring:  $\alpha = .96$ ). A standardized score was computed for this scale. The TVIP (Dunn, Lugo, Padilla, & Dunn, 1986) is the Spanish version of the PPVT (fall:  $\alpha = .92$ ; spring:  $\alpha = .93$ ).

The Oral and Written Language Scale-Oral Expression Scale (OWLS; Carrow-Woolfolk, 1995) assesses children's understanding and use of spoken language (English only; fall:  $\alpha = .92$ ; spring:  $\alpha = .91$ ). After receiving the examiner's verbal stimulus, the child looked at a picture board and responded orally by answering a question, completing a sentence, or generating a sentence. A standardized score was computed for this scale.

Woodcock-Johnson (WJ) III Tests of Achievement (Woodcock, McGrew, & Mather, 2001) are well-established measures of academic achievement, and the Spanish versions are the Bateria Woodcock-Muñoz-Revisada: Pruebas de Aprovechamiento (Woodcock & Munoz-Sandoval, 1996). The Applied Problems subtest is a mathematics test that assessed children's ability to comprehend the nature of a problem, identify relevant information, and perform simple calculations (English fall:  $\alpha = .84$ ; English spring:  $\alpha = .83$ ; Spanish fall:  $\alpha = .81$ ; Spanish spring:  $\alpha = .79$ ). The Letter-Word Identification subtest, administered in the SWEEP study only ( $n = 1805$ ), asks children to identify letters and then words (English fall:  $\alpha = .89$  English spring:  $\alpha = .83$ ; Spanish fall:  $\alpha = .65$ ; Spanish spring:  $\alpha = .89$ ). Most children moved beyond identifying letters to identifying words—that is, their ceiling set included word identification.

Children's ability to identify letters, numbers, and colors, to count, and to write their names were assessed in both the English and Spanish assessment batteries. For identifying letters, children were

shown a set of mixed capital and lowercase letters and asked to identify as many as they could; the maximum score was 26. For identifying numbers, children were shown a sheet of numbers from 1 to 10, presented in random order, and asked to identify as many as they could; the maximum score was 10. For naming colors, children were presented with a page of 10 different colored bears and asked to name the colors; the maximum score was 10. Alphas for identifying letters, numbers and colors for the English and Spanish assessments ranged from .81 to .97. For the counting task, children were asked to count and point with one-to-one correspondence using a picture card with 20 teddy bears. If the child counted to 20 correctly, another sheet of 20 teddy bears was presented to allow continued counting. Finally, children wrote their names and the percent of their name written legibly was calculated.

*Teacher report.* Teacher report of children's language and literacy skills in the fall and spring was an average of nine items from the teacher questionnaire of the Early Childhood Longitudinal Studies-Kindergarten Cohort (West, Denton, & Germino-Hausken, 2000). The items assessed children's proficiency in speaking (e.g., using complex sentence structure), listening, early reading (e.g., predicting what will happen next), and early writing (e.g., using initial consonants to spell words). The items were rated on a scale from 1 (*not yet*) to 5 (*proficient*; fall:  $\alpha = .91$ ; spring:  $\alpha = .92$ ).

#### *Poverty Status*

Information was obtained on whether the children's family lived below the federal poverty threshold (\$17,960 for a family of four in 2001; \$18,660 for the same family in 2003).

#### *Sociodemographic Covariates*

The analysis of group differences across school readiness used the following covariates: child gender, child ethnicity, household size, poverty status, mothers' years of education, and child age at the spring assessment.

## **Results**

### *Descriptives*

The proportion of a day a child spent in a particular activity or setting was computed as the ratio of

the number of intervals the activity or setting was observed divided by the total number of intervals the child was observed. Mean proportions of a day children spent in each activity setting, teacher-child interaction, and preacademic activity are summarized in Table 2.

In terms of activity settings, children spent the largest amount of time in free-choice (30%) and whole-group activities (27%), and the least amount of time in individual time (7%) and meals (7%). In terms of preacademic activities, children spent the most time on esthetics (15%), social studies (15%), and science (11%); the least amount of time was spent in prereading (3%), letter-sound (4%), and being read to (5%). In terms of teacher-child interactions, children spent the largest amount of time in didactic interactions (31%) and the second largest

amount of time in scaffolding (9%); the least amount of time was spent in routine interactions (1%).

Some of the school readiness indicators were correlated. In language and literacy, the following pairs of outcomes had a correlation coefficient of .45 or higher: naming letters and WJ Letter-Word ( $r = .66$ ; all results reported as significant are  $p < .05$  or better), naming letters and percent name written legibly ( $r = .45$ ), naming letters and teacher report of language and literacy ( $r = .49$ ), and OWLS and PPVT ( $r = .68$ ). In mathematics, the following indicator pairs had a correlation coefficient of .45 or higher: WJ applied problems and naming numbers ( $r = .55$ ), WJ applied problems and highest number counted ( $r = .49$ ), and naming numbers and highest number counted ( $r = .55$ ).

Table 2  
Descriptives of Snapshot Variables by Snapshot Profiles

	Overall sample		Free play profile (Profile 1)		Individual instruction profile (Profile 2)		Group instruction profile (Profile 3)		Scaffolded learning profile (Profile 4)		Significant differences ( $p < .05$ ) <sup>a</sup>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Activity settings											
Basics	0.21	0.10	0.20	0.08	0.25	0.09	0.26	0.10	0.16	0.08	SL < FP < II = GI
Free choice	0.30	0.17	0.41	0.12	0.13	0.11	0.15	0.10	0.29	0.13	II = GI < SL < FP
Individual time	0.04	0.07	0.02	0.04	0.21	0.08	0.03	0.04	0.03	0.04	FP = GI = SL < II
Meals	0.12	0.07	0.14	0.07	0.11	0.07	0.10	0.06	0.12	0.07	GI < SL < FP; II < FP
Small group	0.06	0.09	0.04	0.06	0.04	0.07	0.11	0.12	0.06	0.08	FP = II < SL < GI
Whole group	0.27	0.13	0.20	0.09	0.27	0.11	0.36	0.12	0.34	0.12	FP < II < FP < GI
Preacademic and academic activities											
Esthetics	0.15	0.09	0.14	0.09	0.17	0.09	0.15	0.09	0.16	0.10	FP < SL; FP < II; GI < II
Fine motor	0.10	0.08	0.09	0.07	0.17	0.08	0.09	0.07	0.10	0.08	FP = GI = SL < II
Gross motor	0.06	0.06	0.08	0.06	0.03	0.04	0.04	0.05	0.06	0.05	II = GI < SL < FP
Letter and sound	0.04	0.05	0.03	0.03	0.08	0.07	0.05	0.05	0.05	0.05	FP < GI = SL < II
Mathematics	0.08	0.06	0.06	0.05	0.10	0.08	0.10	0.07	0.11	0.07	FP < GI < SL; FP < II
Oral language development	0.06	0.06	0.04	0.04	0.06	0.05	0.05	0.04	0.14	0.08	FP < GI = II < SL
Prereading	0.03	0.04	0.03	0.04	0.04	0.05	0.03	0.04	0.05	0.05	FP = GI < II < SL
Read to	0.05	0.05	0.04	0.04	0.06	0.05	0.06	0.05	0.08	0.06	FP < II = GI < SL
Science	0.11	0.09	0.11	0.09	0.09	0.08	0.09	0.08	0.16	0.12	GI < FP < SL; II < SL
Social studies	0.15	0.11	0.17	0.11	0.08	0.08	0.11	0.08	0.21	0.12	II < GI < FP < SL
Writing	0.01	0.03	0.01	0.02	0.03	0.05	0.01	0.02	0.02	0.03	FP = GI < SL < II
Teacher-child interactions											
Routine	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	None
Minimal	0.03	0.03	0.03	0.03	0.02	0.03	0.02	0.03	0.02	0.03	None
Simple	0.05	0.04	0.06	0.05	0.04	0.04	0.04	0.04	0.05	0.05	II = GI < SL < FP
Elaborated	0.04	0.04	0.04	0.04	0.03	0.04	0.03	0.03	0.06	0.05	II = GI < FP < SL
Scaffold	0.09	0.08	0.06	0.06	0.09	0.07	0.08	0.06	0.21	0.08	FP < GI < II < SL
Didactic	0.31	0.16	0.25	0.14	0.39	0.16	0.35	0.14	0.37	0.17	FP < GI < SL < II

Note. FP = free play profile; II = individual instruction profile; GI = group instruction profile; SL = scaffolded learning profile.

<sup>a</sup>Bonferroni post hoc contrasts were used.

### Latent Class Analysis

Latent class analysis was conducted in a series of steps, the first of which was fitting a one-profile model to the data to establish a baseline. Models with successively increasing numbers of profiles (up to a model with five profiles, which failed to converge) were then tested. Models were compared using the following model fit indices: the Akaike information criterion (AIC; Akaike, 1987), the Bayesian information criterion (BIC; Schwartz, 1978), and the adjusted BIC (ABIC; Sclove, 1987). Smaller values on these indices indicate better fit, but there is no criterion for “good” fit; therefore, these values are only useful for comparing two or more models. Additionally, an entropy approaching 1.0 indicates a clear distinction between profiles (Celeux & Soromenho, 1996). The four-profile model was the best fitting model with the smallest AIC (−186005.275), BIC (−185277.150), and ABIC (−185667.961), and the largest entropy (0.825). The LCA models were tested using Mplus (Version 4.0; Muthén & Muthén, 1998-2006).

Profiles 1, 2, 3, and 4 included 51%, 9%, 27%, and 13% of the children, respectively. Means and standard deviations of classroom engagements for each profile are summarized in Table 2. Using analysis of variance (ANOVA), we identified significant differences in classroom engagement across profiles. Children in Profile 1 spent by far the most time in free choice (41%), compared to other profiles, and less time than all other groups on a variety of preacademic engagements. Profile 1 is

therefore labeled the “free play” profile. Children in Profile 1 also spent a little more time engaged in gross motor activities (8%) than any other profile and more time than Profiles 2 and 3 in social studies (17%). Children in Profile 2 spent much more time than any other profile in individual time (21%), fine motor skills (17%), and letter-sound (8%). Thus, Profile 2 is labeled the “individual instruction” profile. Children in Profile 3 spent more time than any other profile in whole group (36%) and small group (11%), and this profile is therefore labeled the “group instruction” profile. Children in Profile 4 spent much more time engaged in scaffolding interactions with teachers (21%) than any other profile, and also the most time in elaborated teacher-child interactions (6%). In addition, Profile 4 spent more time than any other profile on many preacademic activities. Therefore, Profile 4 is labeled the “scaffolded learning” profile. Profile 4 spent more time than Profiles 2 and 3 on free-choice activities (29%).

Using ANOVA, we found that the snapshot profiles differed significantly on some demographic characteristics. An examination of household size, maternal education, poverty status, and ethnicity showed that children in the free play and scaffolded learning profiles appeared to be somewhat more privileged than children in the individual instruction and group instruction profiles (see Table 3). Specifically, the free play and scaffolded learning profiles have smaller households and more years of maternal education than children in the individual and group instruction profiles. Children in the indi-

Table 3  
Demographic Information by Snapshot Profiles

	Free play profile		Individual instruction profile		Group instruction profile		Scaffolded learning profile		Significant differences ( $p < .05$ ) <sup>a</sup>
	M or %	SD	M or %	SD	M or %	SD	M or %	SD	
Household size	4.35	1.43	4.81	1.56	4.57	1.45	4.38	1.34	FP = SL < II = GI
Child is poor	0.57	—	0.69	—	0.57	—	0.50	—	FP = SL = GI < II
Mothers years of education	12.77	2.36	12.06	2.58	12.53	2.37	13.00	2.67	II < GI < SL; II < FP
Child age (spring)	5.04	0.32	5.09	0.30	5.06	0.32	5.06	0.31	None
Latino	22%	—	41%	—	29%	—	28%	—	FP < GI < II; SL < II
African American	16%	—	27%	—	24%	—	14%	—	SL = FP < II = GI
Asian American	15%	—	13%	—	10%	—	14%	—	GI < FP
European American	46%	—	19%	—	37%	—	43%	—	II < GI < FP; II < SL
Gender (male)	50%	—	45%	—	49%	—	50%	—	None

Note. FP = free play profile; II = individual instruction profile; GI = group instruction profile; SL = scaffolded learning profile. Percentages are base rates within each profile.

<sup>a</sup>Bonferroni post hoc contrasts were used.



vidual and group instruction profiles were more likely to be Latino or African American than children in the free play or scaffolded learning profiles. Children in the individual instruction profile were also most likely to be poor compared to all other children. No gender differences emerged between profiles.

### *Predicting Academic Gains Based on Profile Membership*

We assessed the predictive validity of the snapshot profiles by examining fall-to-spring gains in school readiness between the four profiles. We used analysis of covariance (ANCOVA) and covaried for household size, poverty status, maternal education, child race/ethnicity, child gender, and child age. Change was assessed by including fall scores as covariates (i.e., predictors) of the spring scores,

such that the residual variance represents change from fall to spring.

Table 4 shows the scores for each profile of children and for each outcome. For example, the score of 12.19 on naming letters in the column "Free play profile" indicates that after adjusting for covariates, children in the free play profile were able to name an average of 12 letters. The overall *F* tests revealed significant differences across profiles for the following indicators of school readiness: naming letters, WJ letter-word identification, percent of name written legibly, teacher report of language and literacy skills, WJ applied problems, naming numbers, and highest number counted. Bonferroni post hoc contrasts were then used to examine pairwise differences between profiles.

The free play profile made the smallest gains across language and literacy and mathematics.

Table 4  
*Residual Change Scores From Fall to Spring of Prekindergarten, by Snapshot Profiles*

	Free play profile		Individual instruction profile		Group instruction profile		Scaffolded learning profile			
	<i>n</i> = 1398		<i>n</i> = 245		<i>n</i> = 755		<i>n</i> = 353			
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>F</i> -test, significant differences ( <i>p</i> < .05) <sup>a</sup>	Partial eta <sup>2</sup>
Language and literacy										
Naming letters	12.19	0.17	14.64	0.41	14.21	0.22	13.73	0.34	<i>F</i> (3, 2391) = 22.76*** FP < SL = GI = II	0.03
Naming colors	8.96	0.05	9.00	0.12	9.03	0.06	9.09	0.10	<i>F</i> (3, 2392) = 0.53	0.00
PPVT (standardized score)	96.81	0.25	96.77	0.65	97.24	0.34	96.83	0.49	<i>F</i> (3, 2279) = 0.39	0.00
TVIP (standardized score)	85.76	1.24	84.41	1.48	84.15	1.18	83.94	2.15	<i>F</i> (3, 235) = 0.37	0.01
OWLS (Oral and Written Language)	94.82	0.24	94.29	0.65	94.37	0.33	94.63	0.49	<i>F</i> (3, 2022) = 0.50	0.00
WJ letter–word identification	342.92	0.74	351.28	1.35	350.21	0.76	346.68	1.14	<i>F</i> (3, 1548) = 18.76*** FP < SL = GI = II	0.04
Percent name legible	83.41	0.63	89.32	1.50	88.85	0.83	85.76	1.24	<i>F</i> (3, 2359) = 10.82*** FP < GI = II	0.01
Language and literacy (teacher report)	2.94	0.02	3.15	0.06	3.06	0.03	3.09	0.05	<i>F</i> (3, 1984) = 6.64*** FP < SL = GI = II	0.01
Mathematics										
WJ applied problems	412.35	0.36	416.50	0.85	413.14	0.47	412.63	0.70	<i>F</i> (3, 2372) = 6.73*** FP = SL = GI < II	0.01
Naming numbers	6.40	0.07	6.85	0.17	6.91	0.10	6.85	0.14	<i>F</i> (3, 2391) = 7.42*** FP < SL = GI	0.01
Highest number counted	19.22	0.28	22.58	0.66	21.87	0.37	20.99	0.55	<i>F</i> (3, 2336) = 14.92*** FP < SL = GI = II	0.02

Note. FP = free play profile; GI = group instruction profile; II = individual instruction profile; OWLS = Oral and Written Language Scale-Oral Expression Scale; PPVT = Peabody Picture Vocabulary Test; SL = scaffolded learning profile; TVIP = Test de Vocabulario en Imagenes Peabody; WJ = Woodcock-Johnson.

<sup>a</sup>Bonferroni post hoc contrasts were used.

\*\*\* $p < .001$ .

Specifically, the free play profile showed less growth than all other profiles in naming letters, WJ letter-word identification, teacher report of language and literacy skills, and number counting. The free play profile also showed less growth than the individual and group instruction profiles in writing their names, and less growth than the group instruction profile and the scaffolded learning profile on number counting. Finally, the free play profile showed less growth than the individual instruction profile on the WJ applied problems. There was only one significant difference among the individual instruction, group instruction, and scaffolded learning profiles: the individual instruction profile made the greatest gains on the WJ applied problems.

Although effect sizes (partial  $\eta^2$ ) were small, the differences in gains between groups are meaningful. For example, children in the free play profile scored 8 points lower on the WJ letter-word identification than children in the individual and group instruction profiles; this is large for differences that emerged over the course of less than 1 year. Additionally, measurement error for assessments involving younger children tend to be larger than that for older children, and larger measurement errors result in smaller effect sizes (Burchinal, 2008).

In summary, the free play profile showed less growth across indicators of language/literacy and mathematics compared to the other three profiles. The individual instruction profile outperformed all other groups on WJ applied problems.

#### *Snapshot Profiles as Distinct from Classroom Environmental Quality*

We wanted to show that the snapshot profiles contribute information about children's classroom experiences that is distinct from and adds to information conveyed by classroom ECERS-R scores. Ideally, we wanted to find no mean differences in ECERS-R scores across the four snapshot profiles. However, there were indeed significant differences: The free play profile ( $M = 4.09$ ,  $SD = 0.73$ ) and the scaffolded learning profile ( $M = 4.14$ ,  $SD = 0.75$ ) each had significantly higher scores than the group instruction profile ( $M = 3.42$ ,  $SD = 0.74$ ) and the individual instruction profile ( $M = 3.17$ ,  $SD = 0.63$ ). In spite of finding significant mean differences, the fairly large standard deviations of ECERS-R scores indicates significant overlap in ECERS-R scores across different snapshot profiles; this in turn suggests that the snapshot profiles provide information not already conveyed by the ECERS-R scores.

To further examine whether the Snapshot profiles contain unique information about children's experiences, we repeated the ANCOVA by profile membership, adding the ECERS-R Teaching and Interactions Scale and the CLASS Instructional Climate Scale as covariates in two separate sets of analyses. All analyses yielded nearly identical results to the original analyses, suggesting again that the snapshot profiles captures information about children's experiences unique from that captured by the ECERS-R and CLASS (results are available upon request).

#### *Poverty Status and Children's Classroom Engagement*

To test whether the relationship between gains in school readiness and profile membership varied across poverty status, we conducted a 2 (poverty status)  $\times$  4 (snapshot profile) ANCOVA, covarying for gender, ethnicity, household size, poverty status, maternal education, and child age. Table 5 shows adjusted mean scores by profile membership and by poverty status; interaction effects are also shown.

The interaction between poverty status and snapshot profile membership was significant for WJ letter-word identification and highest number counted, and there was a marginal effect ( $p = .055$ ) for WJ applied problems.

For WJ letter-word identification, highest number counted, and WJ applied problems, poor children in the free play, group instruction, and scaffolded learning profiles made smaller gains than their nonpoor peers. In the individual instruction profile, however, poor children actually made greater gains than nonpoor children across these measures of school readiness.

## **Discussion**

It is useful to think about classroom engagement in terms of number of minutes children spend on each activity during a typical program day. For example, the most frequent activity setting was free play (30%), which occupied an average of 45 min of a part-day, 2.5 hr program—quite a longtime. In contrast, < 8 min/day was devoted to each of the following literacy activities: prereading (3%), letter-sound (4%), and being read to (5%).

Moving beyond whole-sample averages, there was substantial variation in children's classroom engagement. Using a person-centered approach, we identified four profiles of children with distinct

Table 5

*Residual Change Scores From Fall to Spring of Prekindergarten, by Snapshot Profiles and by Poverty Status*

	Free play profile <sup>a</sup>		Individual instruction profile <sup>a</sup>		Group instruction profile <sup>a</sup>		Scaffolded learning profile <sup>a</sup>		Profile Membership × Poverty Status
	Nonpoor	Poor	Nonpoor	Poor	Nonpoor	Poor	Nonpoor	Poor	
	<i>n</i> = 604	<i>n</i> = 794	<i>n</i> = 76	<i>n</i> = 169	<i>n</i> = 321	<i>n</i> = 434	<i>n</i> = 178	<i>n</i> = 175	<i>F</i> -test
Language and literacy									
Naming letters	12.44	12.00	13.60	15.02	14.72	13.82	13.79	13.72	1.93
Naming colors	9.08	8.87	8.73	9.10	9.05	9.01	9.13	9.05	1.56
PPVT (standardized score)	97.20	96.45	97.52	96.11	98.07	96.44	96.93	96.87	0.71
OWLS	95.21	94.44	95.42	93.32	95.19	93.58	95.85	93.25	1.19
WJ letter-word identification	346.31	340.40	349.05	351.70	350.75	349.90	348.46	345.35	3.19*
Percent name legible	84.45	82.57	87.61	89.98	88.59	89.06	85.57	86.06	0.82
Language and literacy skills	3.00	2.90	3.16	3.13	3.15	2.99	3.12	3.07	0.47
Mathematics									
WJ applied problems	412.72	412.09	415.09	416.81	414.56	412.04	414.44	410.98	2.54†
Naming numbers	6.58	6.26	6.67	6.89	7.13	6.74	6.79	6.94	1.43
Highest number counted	20.53	18.21	21.54	22.55	23.81	20.33	22.09	20.18	2.69*

*Note.* Comparisons were made between poor and nonpoor children, within classes. Tests of interactions on the TVIP was omitted due to small cell sizes. OWLS = Oral and Written Language Scale–Oral Expression Scale; PPVT = Peabody Picture Vocabulary Test; TVIP = Test de Vocabulario en Imagenes Peabody; WJ = Woodcock-Johnson.

<sup>a</sup>Mean values.

†*p* < .06. \**p* < .05.

patterns of classroom engagement: a free play profile for whom class time was dominated by free-choice activities; two instructional profiles that spent a lot of time receiving teacher instruction, whether in an individual or group format; and one scaffolded learning profile that engaged in large amounts of teacher scaffolding.

We had expected a profile of children that received frequent teacher instruction. We did not expect, however, two instructional profiles that were distinct in terms of the format—individual or group—in which they received teacher instruction. Advantages of individual settings include increased attention for teacher directions and greater need for self-regulation while giving children an opportunity to practice skills they already learned (Stright & Supplee, 2002). An advantage of the group activity setting is that children have the opportunity to share ideas and learn from one another. These results suggest that among the teachers who practice the instructional model of early childhood education, some teachers prefer to deliver instruction via individual seatwork while other teachers prefer to deliver instruction via group work.

Next, we found that the free play profile made the smallest fall-to-spring gains across many measures of language and literacy and mathematics compared to the two instructional profiles and the

scaffolded learning profile. Recall that we had included a variety of assessments to explore whether different models of early childhood education were best suited for different domains of learning; our results did not support this hypothesis.

Given that the free play profile was by far the largest profile, making up 51% of the sample children, it was discouraging to find that it was also the profile with the smallest gains in child outcomes. Although these results suggest that the instructional and scaffolding models of early childhood education are more beneficial than the free-choice play model, a caveat exists. Recall that the study sample was at higher demographic risk than the national average: A full 58% of the sample is poor, and the average maternal education is only 12.9 years. Recall also the research showing that instructional support was beneficial for at-risk children, but not necessarily for children not at risk (Hamre & Pianta, 2005). It is possible, therefore, that our finding that classroom instruction was more beneficial than free-choice play is partially the result of having a sample of predominantly at-risk children.

Our study results revealed two further points of interest regarding the scaffolded learning profile. First, the scaffolded learning profile spent a large amount of time in free-choice activities (29%): less

than the free play profile (41%) but a lot more than either of the instructional profiles (13% and 15%). These results suggest that free play, when accompanied by high-quality scaffolding interactions with teachers, remains a model of classroom engagement that may be conducive to children's learning. Second, it was disappointing that although the scaffolded learning profile had more than twice as many scaffolding interactions with teachers as any other profile, children in this profile did not experience the greatest growth compared to other profiles. Subsequent analysis revealed a possible explanation: Children in the scaffolded learning

profile had the highest fall scores across several child outcomes (see Table 6). Recall also that the scaffolded learning profile was the most sociodemographically advantaged of the four profiles with smaller household sizes, a lower likelihood of being poor, and mothers with higher levels of education. As such, these children may have been better prepared for prekindergarten as a result of educational experiences they received in the home. Also, coming from more advantaged families may be directly related to the frequency of scaffolding interactions: These children may experience more scaffolding interactions with parents and therefore may be

Table 6  
Mean Fall and Spring Scores for All Indicators of School Readiness, by Snapshot Profiles

	Free play profile				Individual instruction profile			
	Fall		Spring		Fall		Spring	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Language and literacy								
Naming letters	7.30	8.77	11.66	9.57	7.35	8.98	14.19	9.54
Naming colors	8.23	2.98	8.98	2.29	7.59	3.46	8.67	2.47
PPVT (standardized)	94.36	14.75	96.78	14.10	89.99	14.59	91.92	13.71
TVIP (standardized score)	78.76	11.09	82.67	14.86	82.39	13.00	86.49	14.98
OWLS	92.37	12.77	94.53	12.96	87.42	12.15	89.57	12.32
WJ letter-word identification	330.82	27.10	341.34	27.89	339.58	27.08	355.08	32.12
Percent name legible	59.16	37.81	81.89	28.74	66.34	35.94	90.59	20.52
Language and literacy skills	2.32	0.87	2.97	0.96	2.19	0.86	3.03	1.01
Mathematics								
WJ applied problems	400.78	20.88	411.66	18.94	398.99	21.23	413.10	17.69
Naming numbers	4.14	3.90	6.19	3.71	4.16	3.99	6.74	3.44
Highest number counted	13.68	9.97	18.52	11.46	13.86	10.20	21.60	12.89
	Group instruction profile				Scaffolded learning profile			
	Fall		Spring		Fall		Spring	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Language and literacy								
Naming letters	7.42	8.60	13.86	9.51	9.49	9.28	15.05	9.42
Naming colors	7.97	3.14	8.95	2.26	8.27	3.04	9.19	2.04
PPVT (standardized)	92.59	14.78	95.61	14.13	96.49	16.58	97.89	15.53
TVIP (standardized score)	77.77	11.96	83.88	13.89	77.96	15.66	82.17	15.79
OWLS	89.90	13.10	92.29	12.62	93.96	14.21	95.10	13.79
WJ letter-word identification	330.55	24.23	348.25	24.90	335.32	26.12	348.34	25.96
Percent name legible	60.36	36.69	87.67	23.59	68.82	36.25	88.81	22.40
Language and literacy skills	2.16	0.83	2.96	0.95	2.48	1.00	3.21	0.98
Mathematics								
WJ applied problems	399.27	20.82	411.73	18.08	404.27	20.60	414.77	20.96
Naming numbers	4.21	3.89	6.83	3.60	5.03	4.03	7.36	3.45
Highest number counted	14.09	9.71	21.32	12.39	14.52	10.11	21.15	11.72

Note. OWLS = Oral and Written Language Scale-Oral Expression Scale; PPVT = Peabody Picture Vocabulary Test; TVIP = Test de Vocabulario en Imagenes Peabody; WJ = Woodcock-Johnson.

more likely to elicit and sustain scaffolding interactions with teachers.

Note that for the individual instruction profile, the standard errors of many child outcome measures are larger than for other profiles; this is because the individual instruction profile had fewer children than the other three profiles. Had the standard errors been smaller, more differences between the individual instruction profile and the free play profile may have been statistically significant. Therefore, the small size of the individual instruction profile had the effect of making the results more conservative.

The study examined a variety of child outcomes—from higher order language and problem-solving skills to basic letter and number recognition skills—that are important predictors of later elementary school reading and mathematics. The WJ battery of achievement tests are good predictors of later academic achievement (McGrew, 1986). Less obvious, perhaps, is that basic skills such as naming letters and counting are also important for later academic success. Basic literacy skills developed in preschool such as naming letters and writing one's own name partially determine reading development in early elementary school (Lonigan, Burgess, & Anthony, 2000; Storch & Whitehurst, 2002). Likewise, the lack of basic mathematics skills in kindergarten, such as the ability to name numbers, predicted having a mathematics learning disability in third grade (Mazzocco & Thompson, 2005). Further evidence from an early mathematics intervention program suggests that teaching basic number sense to children at risk for having difficulties in mathematics improves later mathematics performance (Griffin, Case, & Siegler, 1994). Although middle-class children may have the opportunity to develop these basic skills at home, low-income children may not; therefore, it is all the more important that low-income children learn these skills at school. Indeed, Delpit (1996) made the case that low-income African American children need to be taught basic skills so that they can translate their oral language fluency and creativity—which they already possess—into a format that is recognized by mainstream society.

The snapshot profiles captured information about children's classroom experiences not captured by the ECERS-R or the CLASS. ANCOVA of children's gains across profiles remained unchanged after the ECERS-R Teaching and Interactions Scale and the CLASS Instructional Climate Scale were separately added as covariates. In addition, the two snapshot profiles that exhibited

greater gains across the prekindergarten year—the individual and group instruction profiles—actually had lower average composite ECERS-R scores compared to the other two profiles. That is, children in lower quality classroom environments (measured by ECERS-R) experienced classroom engagement (measured by the Snapshot) that was associated with *greater* gains in school readiness. These results suggest that the Snapshot captured aspects of children's classroom experiences not captured by the ECERS-R and CLASS.

Looking across poverty status, we found that children in the individual instruction profile were more likely to be poor than children in any other profile. This is consistent with prior research suggesting that teachers of low-SES children tend to focus on developing skills in mathematics and literacy (Lee & Ginsburg, 2007), which are often practiced in individual instruction settings. That the individual instruction profile had the highest proportion of poor children is fortuitously joined by the finding that poor children in the individual instruction profile were the only ones to make greater gains than their nonpoor peers on indicators of mathematics and literacy. This finding is consistent with the view some scholars have expressed that minority and low-income children stand to gain more from a curriculum focused on developing academic skills (Delpit, 1996).

### *Limitations*

Free-choice activities teach children complex skills, such as problem-solving, making plans, and comprehension (Johnson & Yawkey, 1988). Unfortunately, these types of higher order skills were not fully assessed by the measures included in the Multi-State and SWEEP studies; thus, gains made by children in the free play profile may not have been captured. Nonetheless, assessments, such as the PPVT, OWLS, and WJ do capture more advanced language and cognitive abilities, and the free play profile still made smaller gains on these assessments than other children. Although this study may not have included the most ideal measures for capturing gains made by the free play profile, the results nonetheless suggest that children in the free play profile made smaller gains in many important domains of development.

In all analyses, we treated children's English and Spanish scores on various assessments as equivalent (with the exception of the PPVT and TVIP). Although most children were assessed at both time points in the same language, some children



( $n = 117$ ) were administered the Spanish assessments in the fall and, after passing the Pre-LAS in the spring, were administered the English assessments in the spring. Those children would have been dropped had we not combined the English and Spanish scores. Although it is not ideal to calculate child gains with Spanish assessments at the first time point and English at the second, it is a conservative measure of gains that preserves the number of cases without sacrificing the validity of the results.

Peer interactions were not captured by the snapshot measure. However, children certainly learn through peer interactions, including through peer scaffolding interactions with same-ability classmates (King, Staffieri, & Adelgais, 1998). Also, given that a large amount of time was spent in free play, it would have been instructive to capture whether, during free play, children were engaged in peer interaction and, if so, what type of peer interaction (e.g., parallel play, pretend play). Coding an activity setting simply as free play is somewhat limited because very different types of peer interactions, with different outcomes for children's learning, could all occur during free play. Capturing children's peer engagement would have added a rich dimension to further understanding the relationship between classroom engagement and child outcomes.

Several measures of language and literacy and mathematics were moderately or highly correlated. But because many assessments highlight the different strengths of different snapshot profiles, it is still important to include each measure. For example, although WJ applied problems and naming numbers were highly correlated ( $r = .55$ ), the individual instruction profile excelled (compared to other groups) on WJ applied problems only. Furthermore, previous studies have often examined these outcome measures together (Howes et al., 2008).

#### *Implications for Policy and Practice*

This study described patterns of children's engagement in prekindergarten classrooms and explores whether some patterns of engagement bring about greater gains for children than others. The environmental quality literature thus far has encouraged preschool teachers to think about the arrangement of physical space and the materials available within classrooms. Results from the current study might encourage teachers to think about the allocation of children's time to various class-

room engagements in a way that benefits children's learning.

Increasingly, policy makers and advocacy organizations (e.g., Trust for Early Education, National Institute for Early Education Research) are calling for "high-quality" prekindergarten for every child. These findings remind us that quality can be assessed in multiple ways that yield different quality ratings for the same classrooms. For example, a class might receive a relatively high ECERS-R score for ample materials but have low levels of teacher-child interactions and may therefore not be optimally preparing children for school.

Teachers, educators, and policy makers also need to consider the factors contributing to the lack of high-quality teacher-child interactions. As pressures from federal and state mandates increase, and school districts increase demands for school-ready children, teachers are asked to do increasingly more. They are often trying to fit into a very short morning (a) circle time that includes calendar, weather, counting, good morning greetings, and a story; (b) small-group time to work on a particular skill; (c) one or two meals; (d) trips to the bathroom; and (e) an inside and outside play period. Although full-day programs do offer more hours in the day, many of the extra hours are spent in napping, toileting, and snacks. To our observers, the classrooms often felt pressured, as if teachers were racing to check off the list of things that need to be done. This kind of atmosphere does not give teachers opportunities to interact with children to talk about their lives, their play, or their ideas, nor does it provide opportunities for teachers to be responsive to children's interests and needs. Results from this study suggest that more quality instructional time spent with teachers, and less free play time spent without teacher guidance or scaffolding, would better prepare children for entering school.

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